

Curricular Unit Sheet

1. Curricular Unit Syllabus.

1.1. Curricular Unit

Electricity Markets

1.2. Scientific area acronym

Economics and Management

1.3. Duration

One semester

1.4. Total of Working Hours

162

1.5. Contact hours

67,5

1.6. ECTS

6

1.7. Observations

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2. Responsible Academic staff and lecturing load in the curricular unit (enter full name)

João Hermínio Ninitas Lagarto

3,0 hours

3. Other academic staff and lecturing load in the curricular unit

Jorge Alberto Mendes de Sousa

1,5 hours

4. Learning outcomes of the curricular unit

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| <ol style="list-style-type: none">1. Chain knowledge in order to resolve problems concerning the liberalized electricity sector.2. Acquire skills in economic management of a power system under centralized and liberalized.3. Recognize the importance of the ancillary services for power systems operation.4. Grasp the Portuguese electric sector tariff in light of the electric sector structure.5. Relate the energy issue with their external environment and to understand the mechanisms of internalization existing6. Exposing solutions with technical proficiency and communicative. |
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5. Syllabus

1. Management of electric power systems under centralized dispatch:
Economic dispatch; Unit commitment; Hydrothermal coordination; pumped storage hydro.
2. Management of electric power systems in liberalized markets.
The restructuring of the electricity sector. The Iberian Electricity Market (MIBEL).
3. Ancillary services. Primary, secondary and tertiary regulation. Ancillary services markets.
4. Electricity markets integration. Congestion management mechanisms.
5. Structure of the Portuguese electric sector (SEN). Portuguese electric sector tariff.
6. Externalities and environmental markets
Impact of the Kyoto Protocol in the electric sector; greenhouse gases emissions trading; green certificates.

6. Demonstration of the syllabus coherence with the curricular unit's objectives

The syllabus indicated allow us to achieve the objectives of the course both in terms of formal learning and in the acquisition of the necessary skills in the field for the application of knowledge to the professional context.

7. Teaching methodologies (including evaluation)

In the theoretical classes (T), the curricular contents of the UC are taught, opening the discussion of relevant topics to the participation of the students.

In theoretical-practical classes (TP), exercises related to the contents taught in the theoretical classes are solved, encouraging students to work the exercises independently.

In practical classes (PL), the contents will be subject to resolution through computer simulation with GAMS.

The evaluation of the course is based on two components:

- Intermediate test and exam (partial or full) with 50% weighting.
- Practical component with 50% weighting.

8. Demonstration of the coherence between the teaching methodologies and the learning outcomes

The teaching methodologies applied help to achieve the goals set for the course in a consistent and effective way.

9. Bibliography

1. Allen J. Wood, Bruce F. Wollenberg, Power Generation, Operation & Control, John Wiley & Sons, 1984.
2. M. Ilic, F. Galiana, L. Fink, Power Systems Restructuring: Engineering and Economics, Kluwer Academic Publishers, 1998.
3. Competition in Electricity Markets International energy Agency, 2001.
4. Portuguese electric sector tariff regulation, ERSE, December 2014.
5. International Emission Trading - From Concept to Reality, International energy Agency, 2001.
6. Handouts of the course made available on the Moodle platform.
7. Scientific papers provided by the teacher.